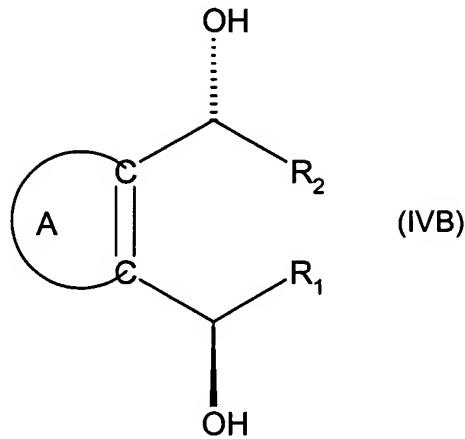
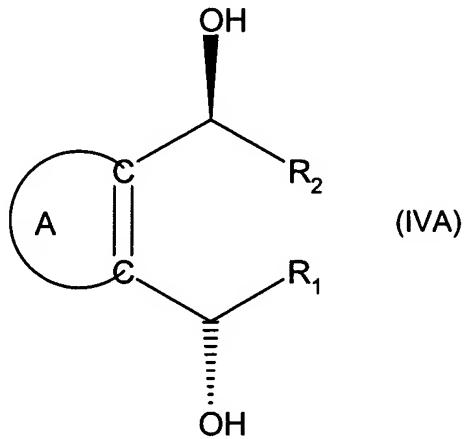
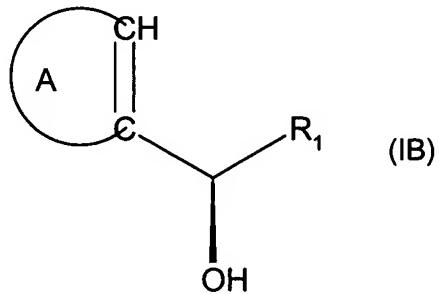
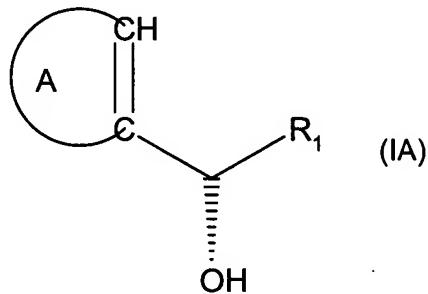


1. (currently amended): A ~~method~~ process for the preparation of C_2 -symmetric 1,4-diols of the formula IVA or IVB having a high enantiomeric purity

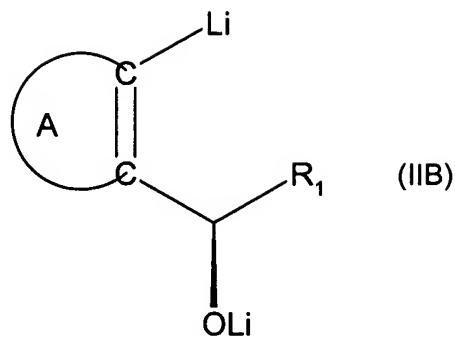
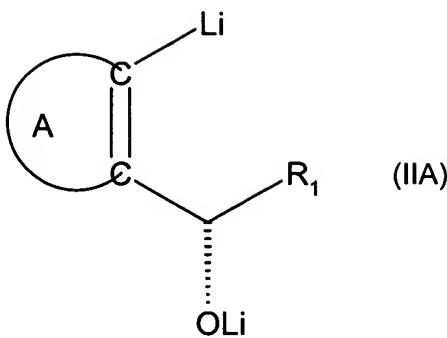


wherein ring A which includes the shown double bond forms a mono-, di- or polycyclic aromatic or heteroaromatic ring and R₁ and R₂ are, independently of each other, an organic moiety,

~~the process~~ ~~or method~~ comprising reacting an α -(aryl or heteroaryl)- α -substituted alkanol compound of the formula IA (for the synthesis of a compound of the formula IVA) or IB (for the synthesis of a compound of the formula IVB)

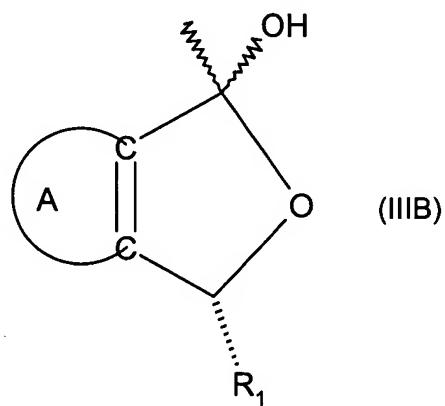
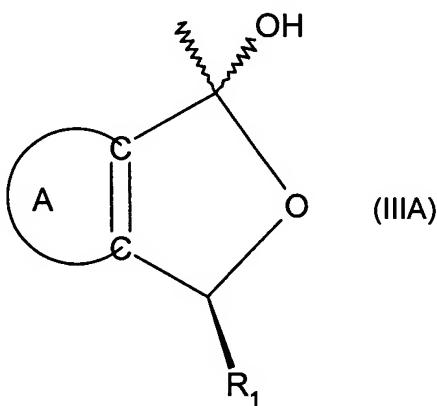


wherein ring A and R₁ are as defined under formula IVA and IVB, with a lithiating reagent, obtaining an intermediate of the formula IIA (from IA) or IIB (from IB),



wherein ring A and R₁ have the meanings given under compounds of the formulae IVA and IVB.

2. (currently amended): The process according to claim 1, further comprising reacting the lithiated product of the formula IIA or IIB, respectively, with an N,N-di-alkyl-formamide to form a hemiacetal compound of the formula IIIA (from IIA) or IIIB (from IIB),



wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA and IVB, and subsequently with a Grignard reagent of the formula R₂MgX wherein R₂ is an organic moiety and X is halogen or, alternatively, using corresponding lithium, zinc or other metal comprising compounds that allow for introduction of R₂; to yield the corresponding compounds of formula IVA (from IIIA) and IVB (from IIIB).

3. (currently amended): The method process according to claim 1, further comprising reacting an aldehyde of the formula VI



wherein R₂ is as defined for compounds of the formulae IVA and IVB, with the intermediate of the formula IIA to yield a compound of the formula IVA or of the formula IIB to yield a compound of the formula IVB.

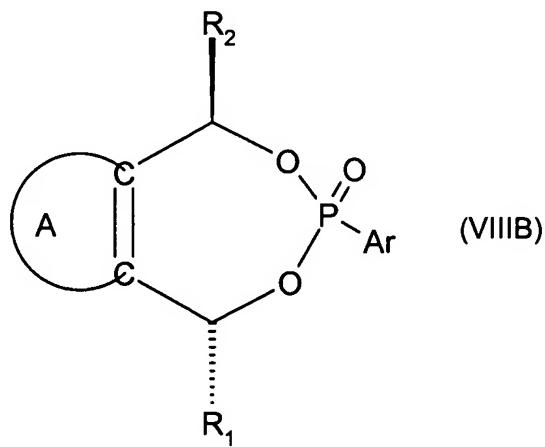
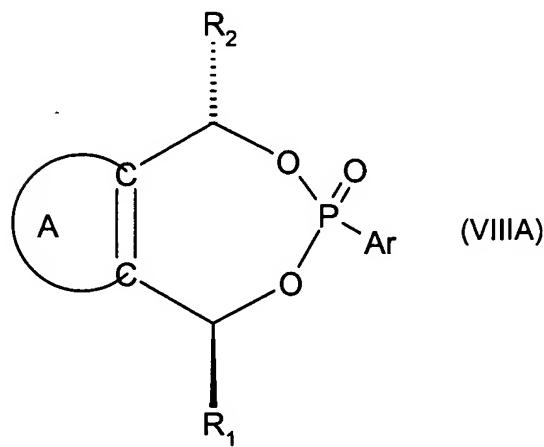
4. (original): A compound of the formula IVA or IVB as shown in claim 1 having a high enantiomeric purity, wherein ring A, R₁ and R₂ are as defined in claim 1, with the proviso that R₁ and R₂ are not simultaneously methyl or ethyl.

5. (currently amended): A process for the preparation of a ligand of the formula XA, XA*, XB or XB* given below,

said process comprising reacting a compound of the formula IVA (for the synthesis of a compound of the formula XA) or IVB (for the synthesis of a compound of the formula XB) obtained according to ~~any one of claims~~ claim 1 to 3 with an aryl phosphinic acid halogenide of the formula VII;



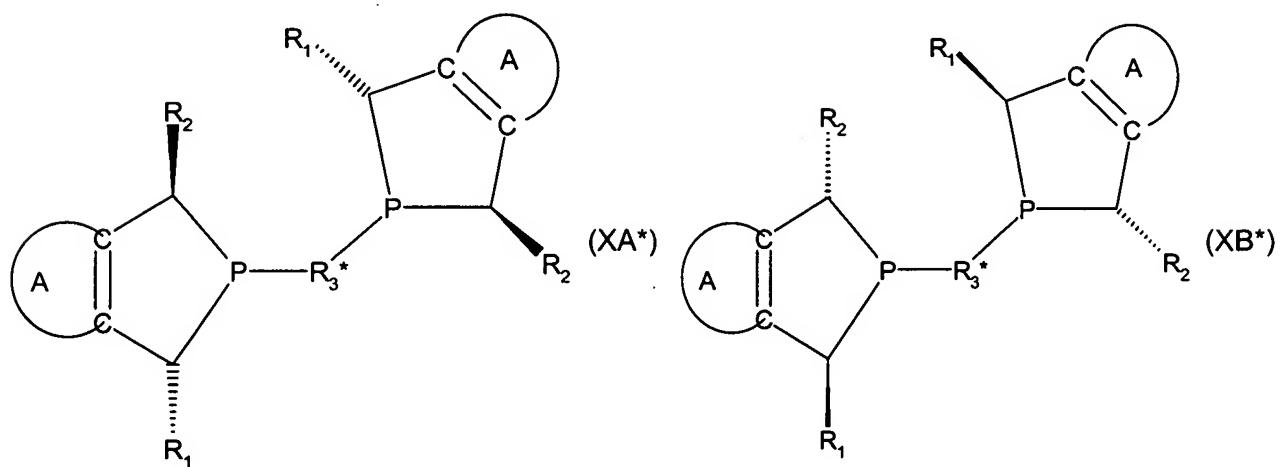
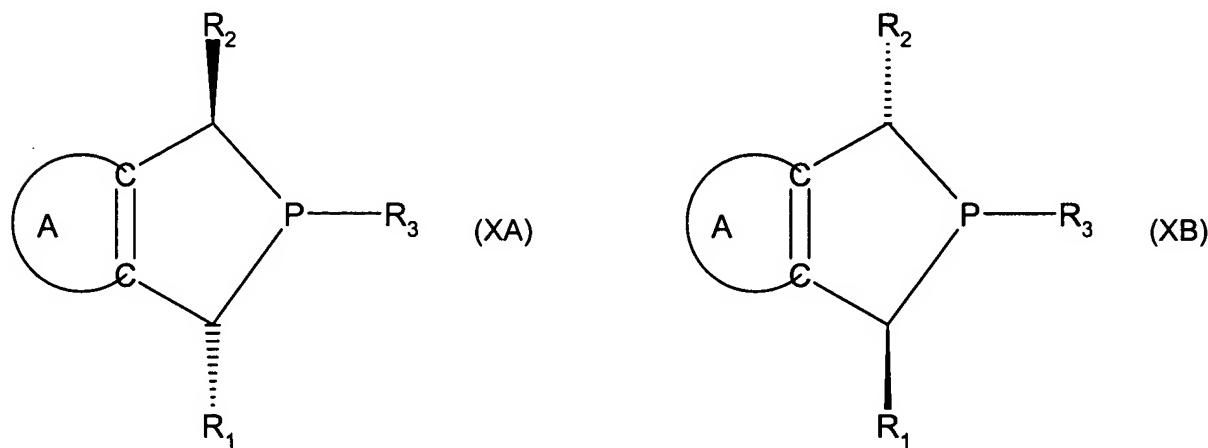
wherein Ar is aryl, especially phenyl, and Hal is halogen, especially chlorine, in the presence of a base resulting in the formation of a phosphonate ester compound of the formula VIIIA (from IVA) or VIIIB (from IVB), respectively,



wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA and IVB and Ar is aryl, and then reacting a compound of the formula VIIIA or VIIIB with a phosphine of the formula IX or IX*,



(or the corresponding borane adduct thereof) wherein R₃ is a monovalent, and R₃* is a bivalent organic moiety that can be bound to phosphorus, resulting in a phospholane compound of the formula XA or XA* (from VIIIA); or XB or XB* (from VIIIB), respectively,



wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA or IVB and R₃ or R₃* is as defined under formulae IX and IX*, respectively.

6. (original): A ligand of the formula XA, XA*, XB or XB*, as shown and defined in claim 5.

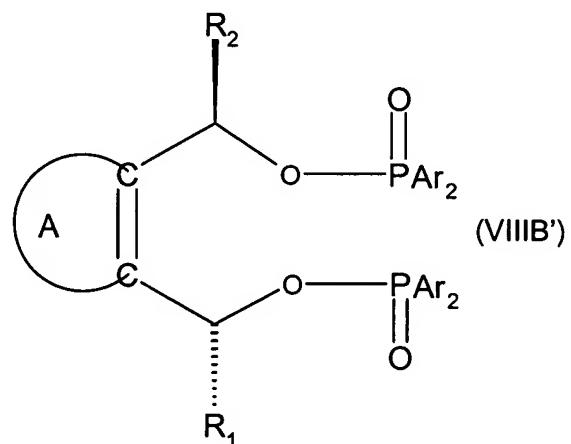
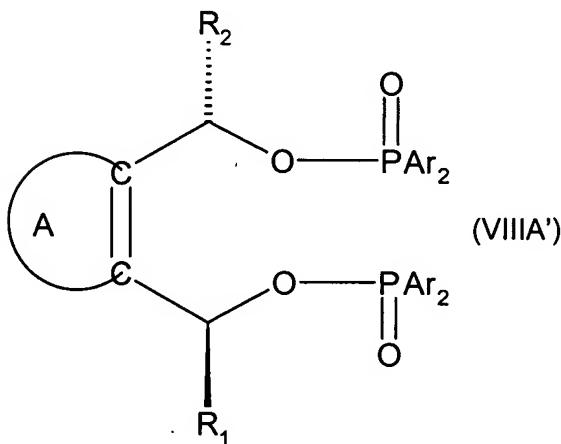
7. (original): A transition metal complex comprising a ligand of the formula XA, XA*, XB or XB*, as shown and defined in claim 5.

8. (currently amended): A process for the preparation of a ligand of the formula XA, XA*, XB or XB* given below,

said process comprising reacting a compound of the formula IVA (for the synthesis of a compound of the formula XA) or IVB (for the synthesis of a compound of the formula XB) obtained according to any one of claims claim 1 to 3 with an aryl phosphinic acid halogenide of the formula VII';

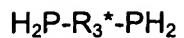


wherein Ar is aryl, especially phenyl, and Hal is halogen, especially chlorine, in the presence of a base resulting in the formation of a compound of the formula VIIIA' (from IVA) or VIIIB' (from IVB), respectively,



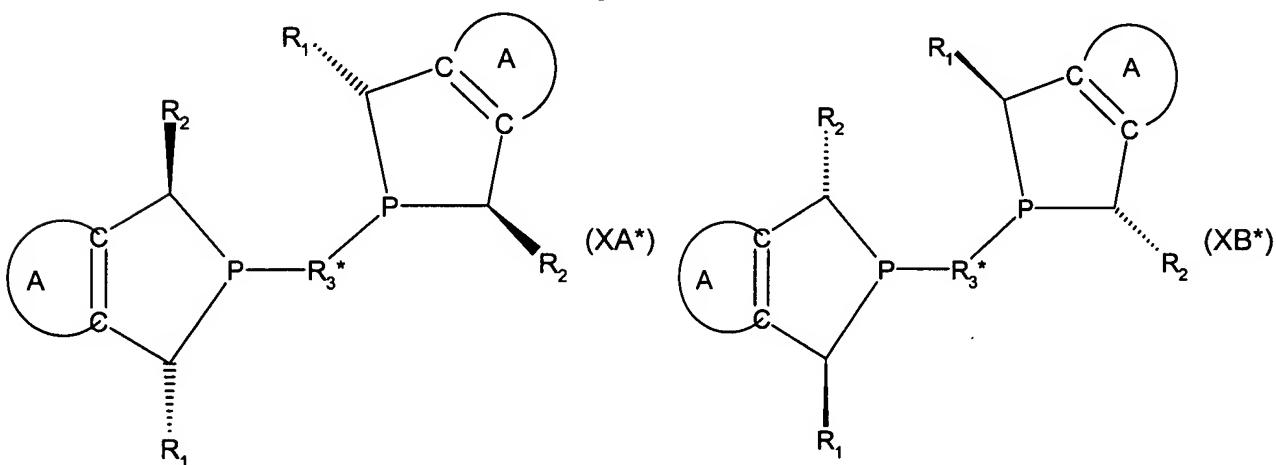
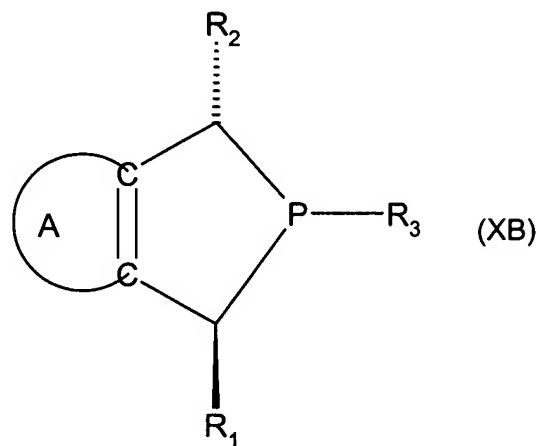
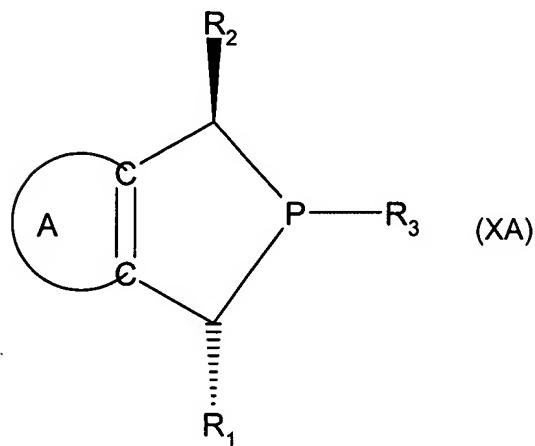
wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA and IVB in claim 1 and Ar is aryl, and then reacting a compound of the formula VIIIA' or VIIIB' with a phosphine of the formula IX or IX*,





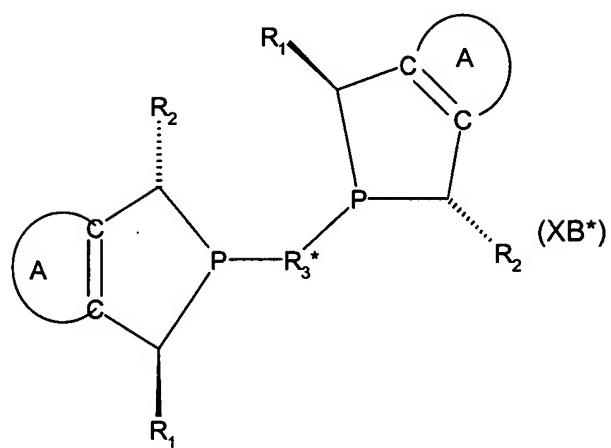
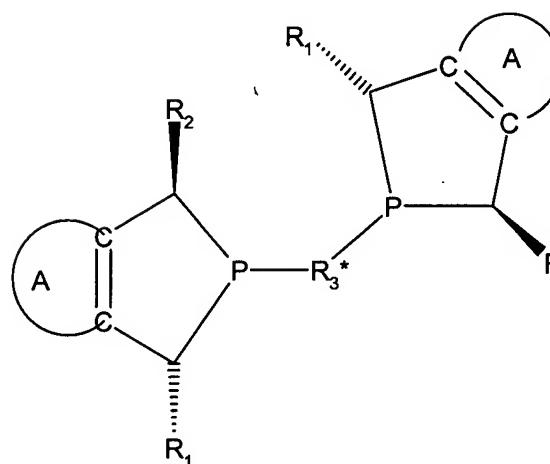
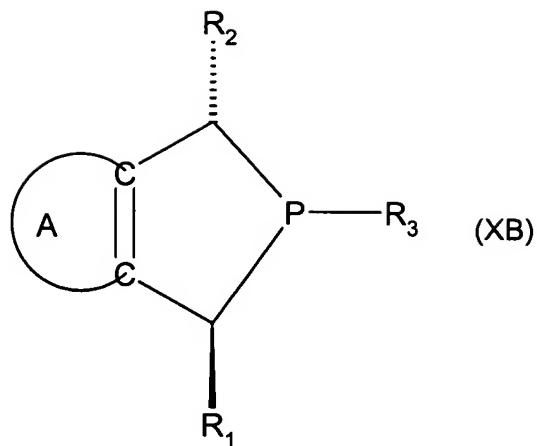
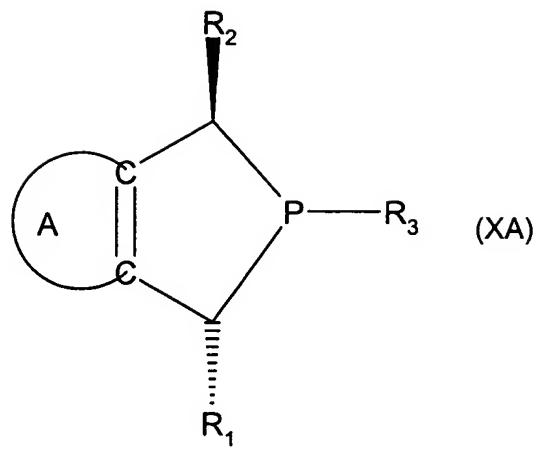
(IX*)

(or the corresponding borane adduct thereof) wherein R_3 is a monovalent, and R_3^* is a bivalent organic moiety that can be bound to phosphorus, resulting in a phospholane compound of the formula XA or XA^* (from VIIA); or XB or XB^* (from VIIIB), respectively,



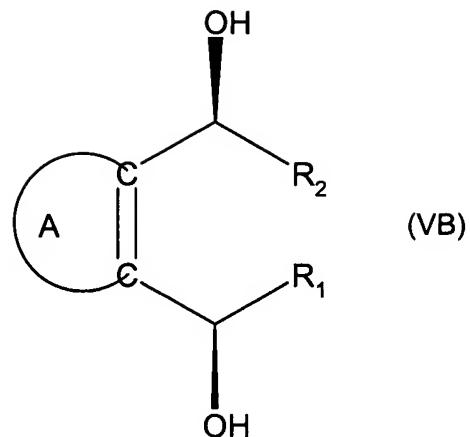
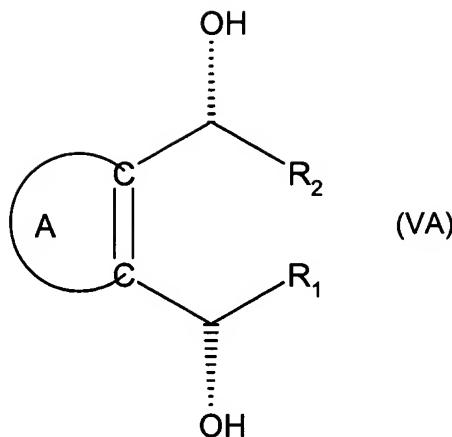
wherein ring A , R_1 and R_2 have the meanings indicated for compounds of the formula IVA or IVB in claim 1 and R_3 or R_3^* is as defined under formulae IX and IX*, respectively.

9. (currently amended): A process for the preparation of a compound of the formula XA , XA^* , XB or XB^* ,

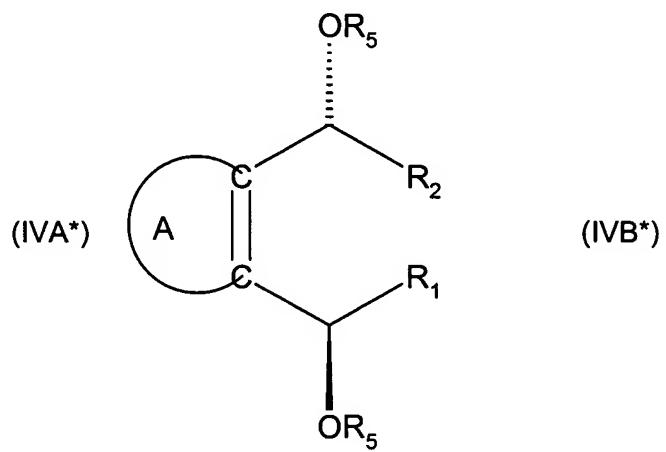
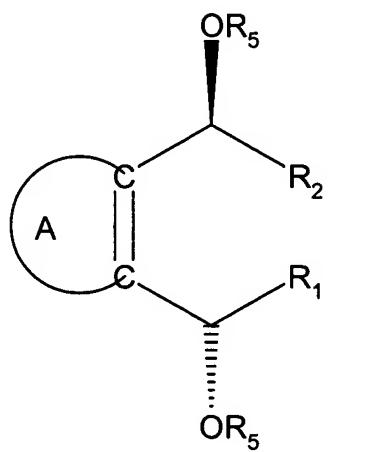


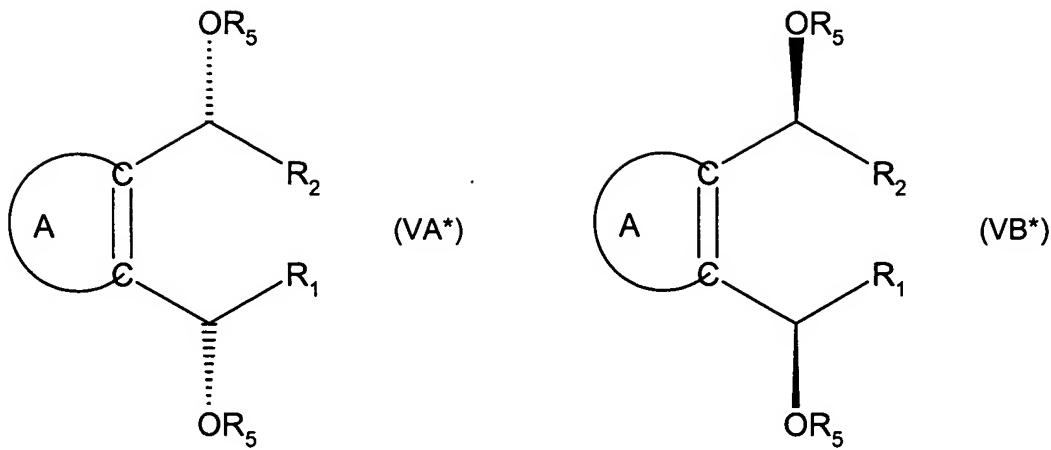
wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA or IVB in claim 1 and R₃ or R₃* is as defined under formulae IX and IX*, respectively

said process comprising reacting a compound of the formula IVA or IVB given in claim 1, or a mixture of a compound of the formula IVA and VA, or of a compound of the formula IVB and VB,



wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA and IVB, with an agent introducing an acyl protecting group, obtaining the corresponding bis-hydroxy-protected compounds of the formula IVA* (from IVA), IVB* (from IVB), or mixtures of a compound of the formula IVA* and VA* (from a mixture of a compound of the formula IVA and VA) or of a compound of the formula IVB* and VB* (from a mixture of a compound of the formula IVB and VB),





wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA and IVB and R₅ is acyl, and then reacting the compound or compounds to the corresponding compounds of the formulae XA shown above with a compound of the formula IX,



or a borane adduct thereof, wherein R₃ is a monovalent organic moiety that can be bound to phosphorus,

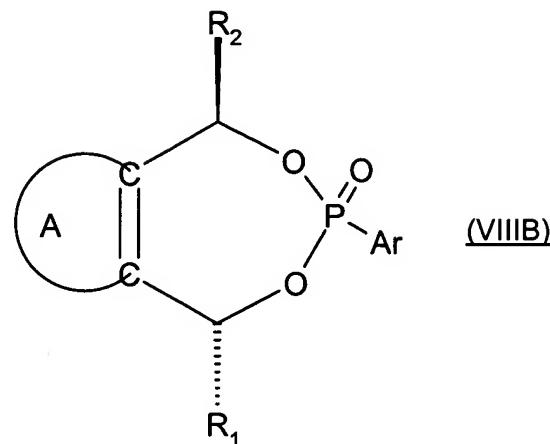
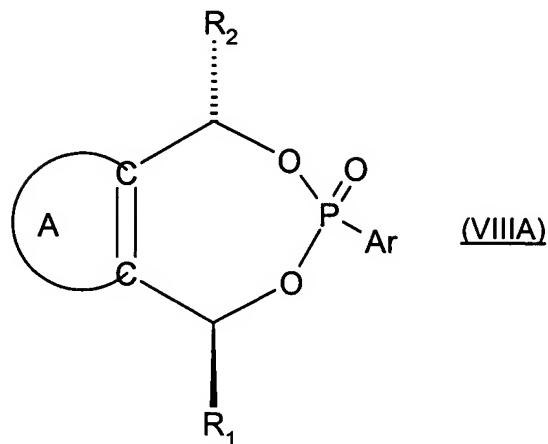
or for a compound of the formula XA* shown above with a compound of the formula IX*,



or a borane adduct thereof, wherein R₃* is a bivalent organic moiety that can be bound to phosphorus, in both cases starting from a compound of the formula IVA*(alone or ~~less preferably~~ optionally in mixture with a compound of the formula VA*);

or of the formula XB shown above with a compound of the formula IX shown above or a borane adduct thereof, or to a compound of the formula XB* shown above with a compound of the formula IX* shown above or a borane adduct thereof, in both cases starting from a compound of the formula from IVB* (alone or ~~less preferably~~ optionally in mixture with a compound of the formula VB*), in the case of mixtures of compounds of the formula IVA* and VA* or IVB* and VB* ~~preferably~~ optionally after isolating the compounds of the formula IVA* or IVB*, respectively, from the undesired enantiomer of the formula VA* or VB*.

10. (currently amended): The process according to claim 9, further comprising reacting the compound of the formula



wherein ring A, R₁ and R₂ have the meanings indicated for compounds of the formula IVA and IVB in claim 9 and Ar is aryl, VIIIA or VIIIB with a phosphine of the formula IX or IX*,



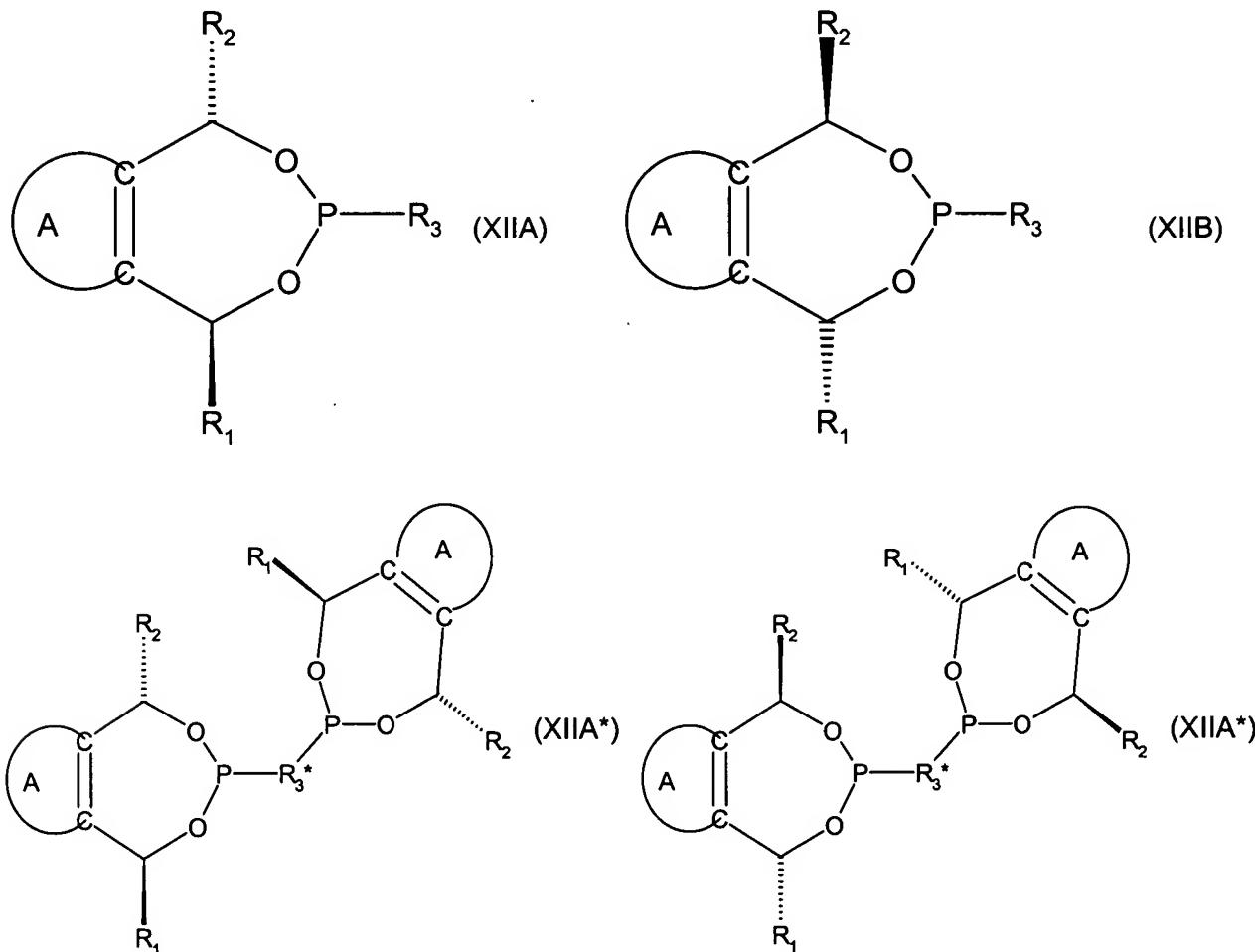
(or the corresponding borane adduct thereof) wherein R₃ is a monovalent, and R₃* a bivalent organic moiety that can be bound to phosphorus, resulting in a phospholane compound of the formula XA or XA* (from VIIIA); or XB or XB* (from VIIIB) shown in claim 5 or 9, respectively.

11. (currently amended): A process for the preparation of a ligand of the formula XIIA or XIIA* shown below from a compound of the formula IVA as defined in claim 1 or of the formula XIIIB or XIIIB* shown below from a compound of the formula IVB as defined in claim 1, comprising

a) reacting a compound of the formula IVA or IVB with a compound of the formula XI or XI*,

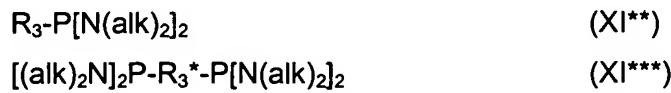


wherein R_3 is a monovalent, and R_3^* a bivalent organic moiety that can be bound to phosphorus and L is a leaving group, leading to ligands of the formula XIIA or XIIA* (from IVA) and/or XIIIB or XIIIB* (from IVB),



wherein ring A, R_1 and R_2 have the meanings indicated for compounds of the formula IVA and IVB in claim 1 and R_3 is a monovalent, and R_3^* a bivalent organic moiety that can be bound to phosphorus; or

b) reacting a compound of the formula IVA or IVB with a compound of the formula XI** or XI***,



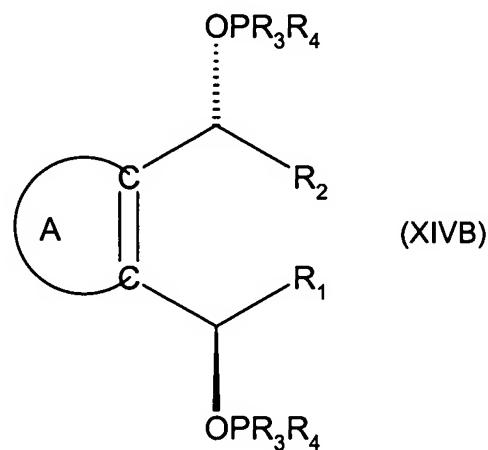
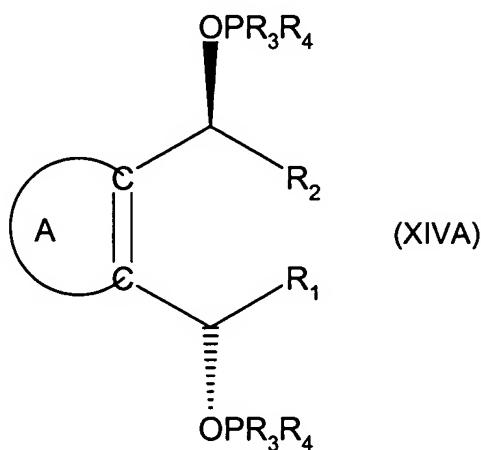
wherein R_3 is a monovalent, and R_3^* a bivalent organic moiety and

alk is alkyl which can be linear or cyclic, especially lower alkyl, in particular methyl, ethyl, 1-propyl or butyl, or is a heterocyclic radical, under with removal of the secondary amine $\text{HN}(\text{alk}_2)_2$, yielding the compound of formula XIIA or XIIA* (from IVA); or XIIB or XIIB* (from IVB) described above, respectively.

12. (original): A ligand of the formula XIIA, XIIA*, XIIB or XIIB*, as shown in claim 11.

13. (original): A transition metal complex comprising a ligand of the formula XIIA, XIIA*, XIIB or XIIB*, as shown in claim 11.

14. (currently amended): A process for the preparation of a ligand of the formula XIVA from a compound of the formula IVA or of the formula XIVB from a compound of the formula IVB,



wherein ring A, R₁ and R₂ are as defined for compounds of the formula XIVA IVA or XIVB IVB in claim 1 and R₃ and R₄ each are, independently of the other, an organic moiety that can be bound to phosphorus,

said process comprising reacting a compound of the formula IVA or VIB given in claim 1, respectively, with

a) a compound of the formula XIII,



wherein R₃ and R₄ are organic moieties that can be bound to phosphorus and L is a leaving group, resulting in a compound of the formula XIV A (from IVA) or XIV B (from IVB), respectively; or

b) with a compound of the formula XIII*,



wherein R₃ and R₄ are, independently from each other, an organic moiety and alk is alkyl which can be linear or cyclic, especially lower alkyl, in particular methyl, ethyl, 1-propyl or butyl, or is a heterocyclic radical, under with removal of the amine H₂N(alk)₂.

15. (original): A ligand of the formula XIV A or XIV B, as shown in claim 14.

16. (original): A transition metal complex comprising a ligand of the formula XIV A or XIV B, as shown in claim 14.

17. (cancelled).